

WHAT IS CLAIMED IS:

1. A laser beam scanner for forming a scanning line along a main-scanning direction with a laser beam, comprising:

a laser diode that emits a laser beam;

5 a first converging unit that converges the laser beam in a main-scanning direction;

a second converging unit that converges the laser beam, that has been converged by the first converging unit, in a sub-scanning direction substantially perpendicular to the main-scanning direction;

10 a scan start time determination unit that detects, within a predetermined detection area, the laser beam that has been converged by the first converging unit before being converged by the second converging unit, and determines a scan start time upon the detection of the laser beam;

15 a photosensitive medium on which a scanning line is formed along the main-scanning direction; and

a scan controller that controls a start of, at the determined scan start time, scanning the photosensitive medium with the laser beam that has been converged by the first converging unit and the second converging unit.

2. The laser beam scanner as claimed in claim 1, further comprising a  
20 first deflector that deflects the laser beam emitted by the laser diode to the first converging unit.

3. The laser beam scanner as claimed in claim 2, further comprising a  
third converging unit that converges, in the sub-scanning direction, the laser beam that has been converged by the first converging unit and traveling to the scan start time  
25 determination unit, so that the laser beam falls within the predetermined detection area of the scan start time determination unit.

4. The laser beam scanner as claimed in claim 3, further comprising a  
fourth converging unit that converges the laser beam emitted by the laser diode onto the first deflector, wherein the third converging unit and the fourth converging unit are  
30 formed of a same component.

5. The laser beam scanner as claimed in claim 3, wherein the third converging unit converges the laser beam emitted by the laser diode onto the first

deflector, and converges the laser diode that has been converged by the first converging unit onto the scan start time determination unit.

5        6.        The laser beam scanner as claimed in claim 3, further comprising a slit having a predetermined length along the sub-scanning direction, the laser beam passing through the slit toward the scan start time determination unit after being converged by the first converging unit and the third converging unit, wherein the third converging unit converges the laser beam in the sub-scanning direction so that the laser beam falls within the slit.

10       7.        The laser beam scanner as claimed in claim 5, wherein the third converging unit converges the laser beam in the sub-scanning direction onto the scan start time determination unit with a deviation from an optical axis of the laser beam, the deviation being smaller than or equal to a half of the predetermined length.

15       8.        The laser beam scanner as claimed in claim 7, wherein a second traveling distance of the laser beam along an optical axis between the first deflector and the third converging unit is a half of a first traveling distance of the laser beam along the optical axis between the first deflector and the scan start time determination unit.

20       9.        The laser beam scanner as claimed in claim 3, wherein a first traveling distance of the laser beam along an optical axis between the first deflector and the scan start time determination unit is greater than or equal to four times a focal length of the third converging unit.

25       10.       The laser beam scanner as claimed in claim 4, further comprising a second deflector that deflects the laser beam that has been converged by the first converging unit toward the third converging unit.

30       11.       A laser beam scanner for forming a scanning line on a photosensitive medium along a main-scanning direction with a laser beam, comprising:

beam emitting means for emitting a laser beam;

first converging means for converging the laser beam in a main-scanning direction;

second converging means for converging the laser beam, converged by the first converging means, in a sub-scanning direction substantially perpendicular to the main-scanning direction;

scan start time determination means for detecting the laser beam converged by the first converging means, before being converged by the second converging means, within a predetermined detection area and determining a scan start time; and

5 scan controlling means for controlling a start of scanning of a photosensitive medium, at the determined scan start time, with the laser beam converged by the first converging means and the second converging means, thereby forming a scanning line on the photosensitive medium along the main-scanning direction.

10 12. The laser beam scanner as claimed in claim 11, further comprising third converging means for converging, in the sub-scanning direction, the laser beam that has been converged by the first converging means and traveling to the scan start time determination means, so that the laser beam falls within the predetermined detection area of the scan start time determination means.

15 13. A method for forming a scanning line on a photosensitive medium along a main-scanning direction with a laser beam, comprising:  
 emitting a laser beam;  
 converging the laser beam in a main-scanning direction;  
 detecting the laser beam that has been converged in the main-scanning  
 20 direction within a predetermined detection area, and determining a scan start time;  
 converging the laser beam, that has been converged in the main-scanning direction, before reaching a photosensitive medium, in a sub-scanning direction substantially perpendicular to the main-scanning direction; and  
 controlling a start of scanning of the photosensitive medium, at the  
 25 determined scan start time, with the laser beam that has been converged in the main-scanning direction and in the sub-scanning direction, thereby forming a scanning line on the photosensitive medium along the main-scanning direction.

30 14. The method as claimed in claim 13, further comprising the step of converging the laser beam that has been converged in the main-scanning direction, before being detected in the detection step, in the sub-scanning direction, so that the laser beam falls within the predetermined detection area.